MACH 5

# Material and Life Sciences II

## Preconstruction Services Proposal

- Who is MACH 5?
- Project Background
- Estimate Summary
- Summary Schedule
- Construction Plan
- LEED NC Analysis
- Safety Plan
- Use of BIM
- Questions?


**MACH 5**

Ralph Kreider
Charles Miller
Maria Piergallini
Carmen Brutico
Michael Webb

# MACH 5 Mission Statement

Providing quality products in a safe and productive environment. To utilize the most technological tools to plan, manage, and deliver quality products exceeding owners expectations. Also, utilizing sustainable practices through building construction.

Our services allow owner advanced visual stimulations of 2D plans to allow the owner to see the end result before any actual construction begins. It is our goal to never fall into the trap of not trying new innovative technology and building methods because of the idea “that’s the way we’ve always done it.”

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# Project Team

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## Ralph Kreider

(Executive Principal)
(Head Building Information Modeler)
(MEP Coordination Supervisor)

## Charles Miller

(Executive Vice-President )
(Assistant BIM Modeler)
(Senior Scheduling Manager)

## Michael Webb

(LEED Certification Manager)
(Assistant Estimator)
(Assistant Scheduler)

## Maria Piergallini

(Marketing and Public Relations)
(Project Safety Coordinator)

## Carmen Brutico

(Superintendent)
(Senior Estimator)
(Interior Sequence Coordinator)

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# Project Background

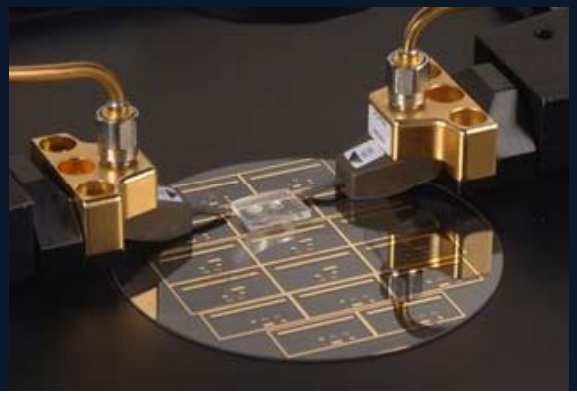
"As one of the nation's leading research universities, Penn State positively impacts our region, our state, our nation, and beyond. Whether the impact is global or local, the object of these efforts remains the same: to create new knowledge that improves people's lives."

—*Eva J. Pell, Senior Vice President for Research and Dean of The Graduate School*



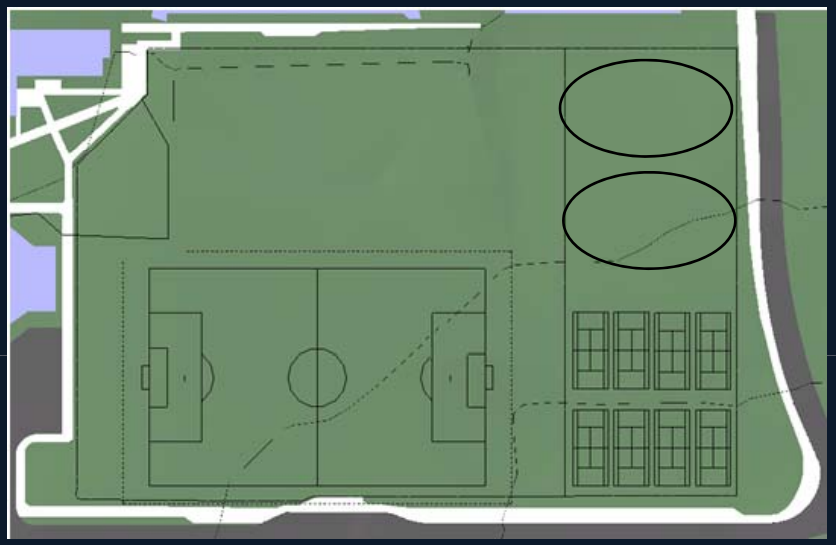
## Unique Features

- Cytometry rooms
- Dark room
- RNA room
- Autoclave
- Clean rooms
- Etching bay
- Lith bay
- Piezoelectrics
- Biophoton labs
- Material characterization labs
- Dielectric labs
- Surface science labs
- Nano research labs
- Neuro-physics.
- Electro-active polymers
- Organic electron and photon labs

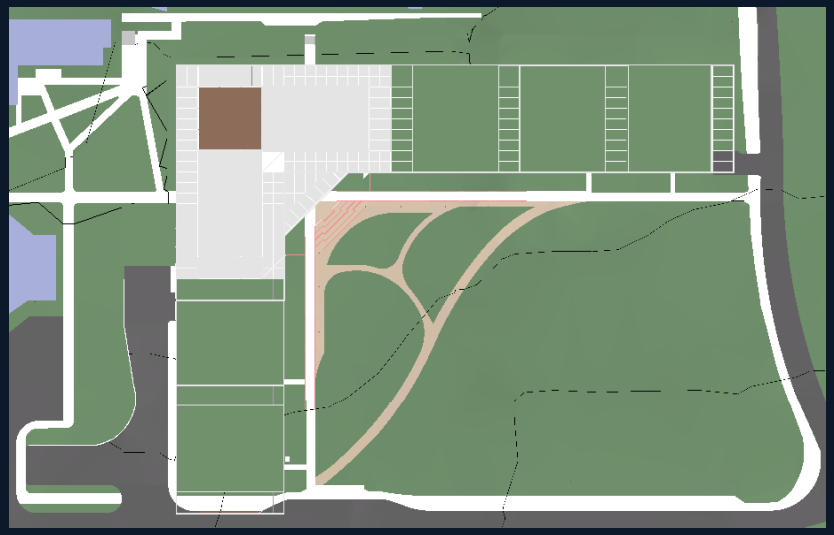


# Project Background





**Present**



**Future**

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# Site Investigation

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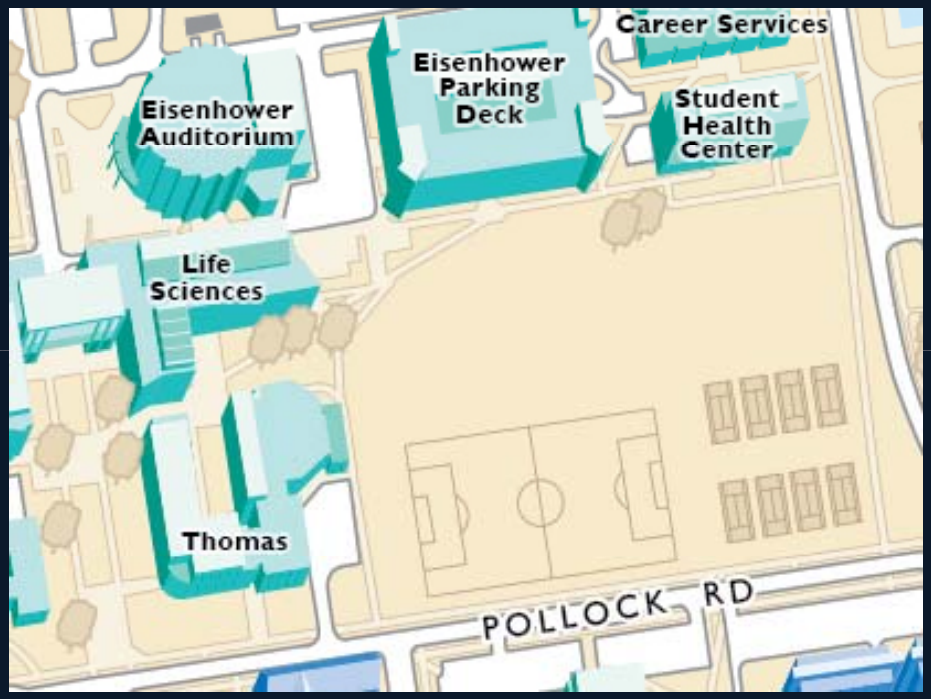
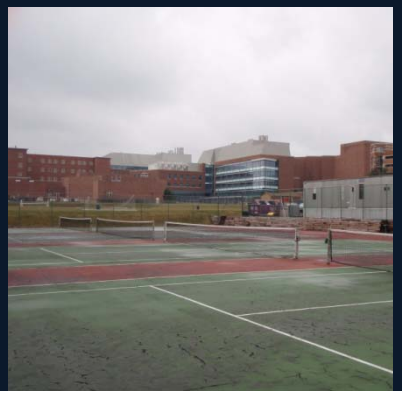



Proposed location of the Material and Life Sciences II Building.

Existing conditions that must be demolished.

New Health Services Building and the Eisenhower Parking Deck



Life Sciences Building and the back of Thomas Building

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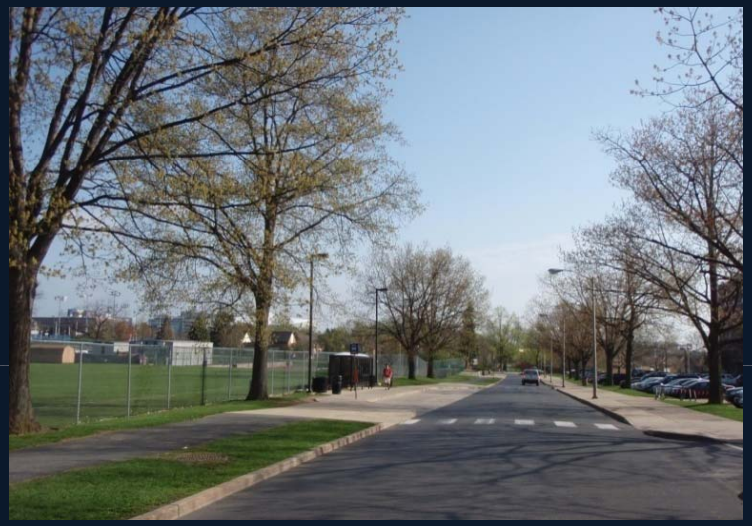
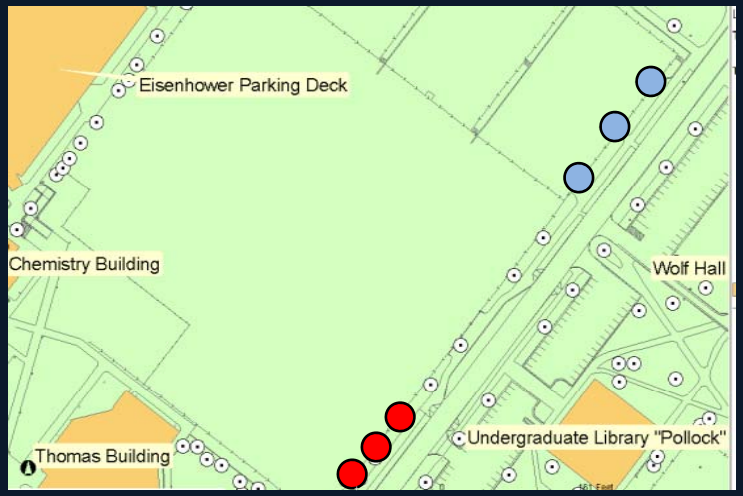


Tree line along Pollock Road




= Trees to be removed

= Trees replanting location

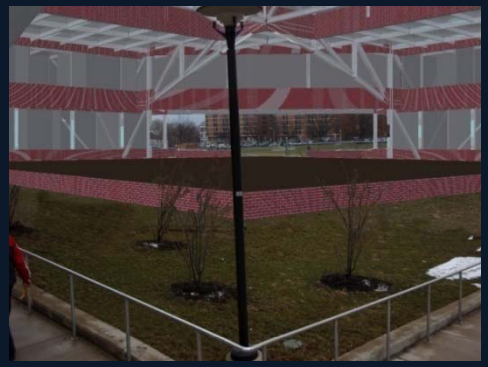
A Penn State tree to be re-planted

Proposed tree re-planting location

# Building Geometry

- Completed by August of 2010
- 4-story 258,735 ft $^2$ research/ lab bldg
- Each floor averages over 60,000 sq. ft.
- Each floor is stacked on top of each other with an offset
- Steel frame cantilever system supporting the open center courtyard





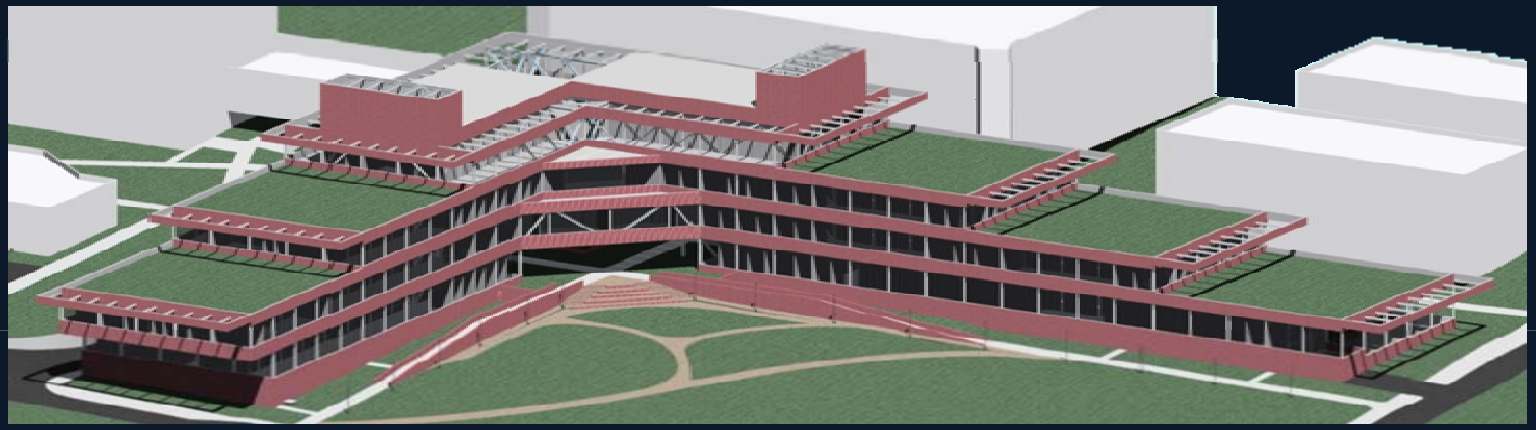
View through corner.

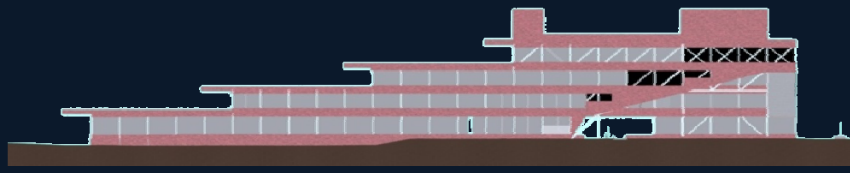
View of green roofs form parking deck.

View of green roofs from Thomas.

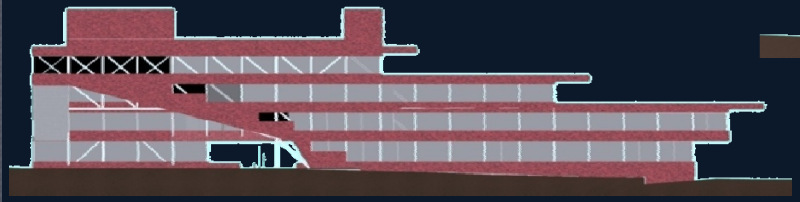
# Building Geometry



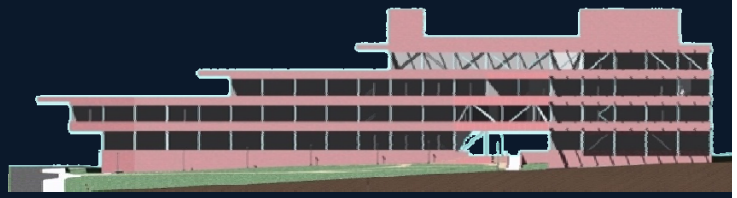




North Elevation



West Elevation



East Elevation

South Elevation

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# Estimate Summary

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| Estimate Summary | | | | | |
|---|---|---|---|---|---|
| Code | Division Name | Detailed Cost | Percentage | Sq Ft Cost | Projected Cost |
| | | | | | |
| 00 | Bidding Requirements | | 7.41% | $24.86 | $6,432,740.00 |
| 01 | General Requirements | | 4.33% | $14.53 | $3,759,541.00 |
| | Administrative Expenses | $1,422,365.00 | | | |
| | Temporary Construction | $519,662.00 | | | |
| | General Operations | $1,817,514.00 | | | |
| 02 | Site Work | | 3.80% | | $3,298,679.00 |
| 03 | Concrete (including foundations) | | 11.09% | $37.19 | $9,621,916.00 |
| | Slab on Grade | $737,600.00 | | | |
| | Slab on Deck | $617,400.00 | | | |
| | Rebar | $443,200.00 | | | |
| 04 | Masonry | | 1.10% | $3.69 | $954,988.00 |
| 05 | Metals | | 8.87% | $29.76 | $7,699,300.00 |
| | Steel Columns | $1,826,000.00 | | | |
| | Steel Beams and Bracing | $5,121,300.00 | | | |
| | Steel Deck | $752,000.00 | | | |
| 06 | Wood & Plastics | | 3.80% | $12.73 | $3,294,603.00 |
| 07 | Thermal & Moisture Protection | | 2.46% | $8.26 | $2,137,232.00 |
| 08 | Doors & Windows | | 3.19% | $10.71 | $2,770,080.00 |
| 09 | Finishes | | 7.60% | $25.51 | $6,600,315.00 |
| 10 | Specialties | | 0.46% | $1.54 | $397,689.00 |
| 11 | Equipment | | 2.60% | $8.71 | $2,252,726.00 |
| 12 | Furnishings | | 0.25% | $0.84 | $218,088.00 |
| 13 | Special Construction | | 0.79% | $2.66 | $689,233.00 |
| 14 | Conveying Systems | | 0.96% | $3.22 | $833,002.00 |
| 15 | Mechanical | | 29.21% | $97.99 | $25,354,522.00 |
| 16 | Electrical | | 12.08% | $40.53 | $10,486,025.00 |
| | | | | **Total Cost** | **$86,800,679.00** |
| | Bonds | | 1.20% | | ,608.15 |
| | Insurance | | 0.60% | | 804.07 |
| | Taxes | | 6.00% | | $5,208,040.74 |
| | Fee | | 2.50% | | $2,170,016.98 |
| | | | **Total Including bo insurance, taxes ar** | | |

$3,759,541

$2,170,017

$95,741,149

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# Cash Flow

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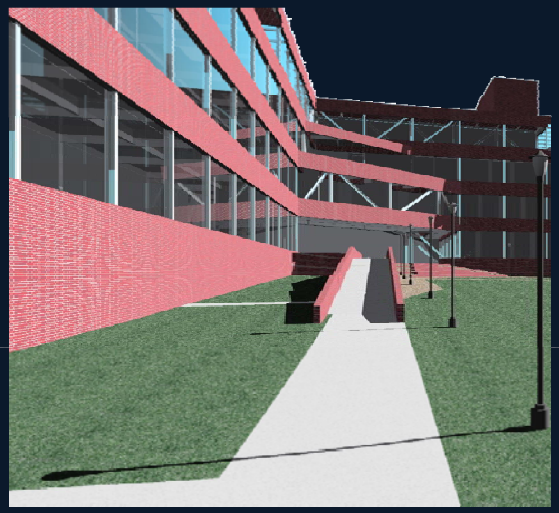
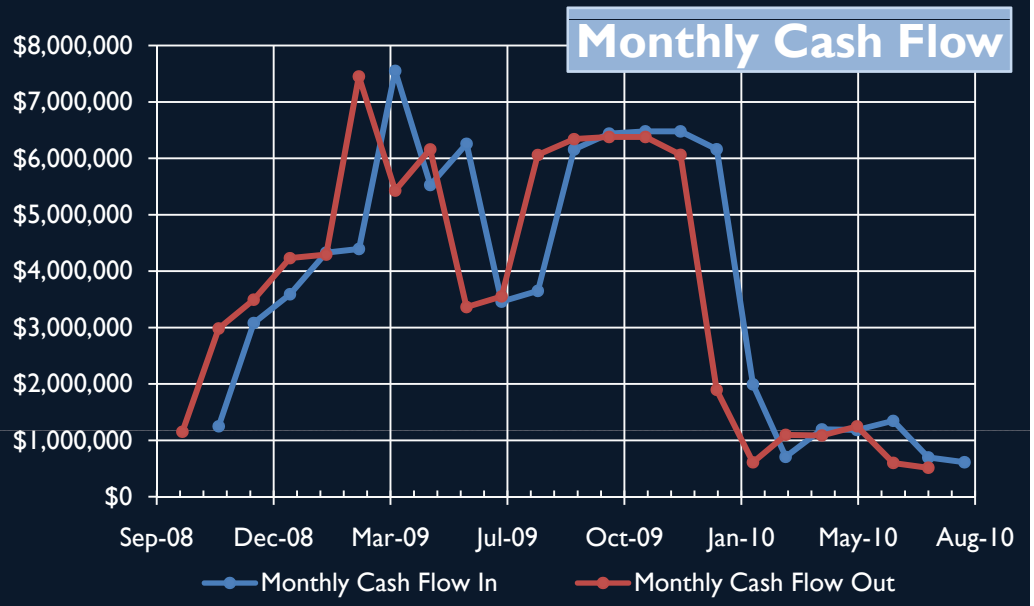
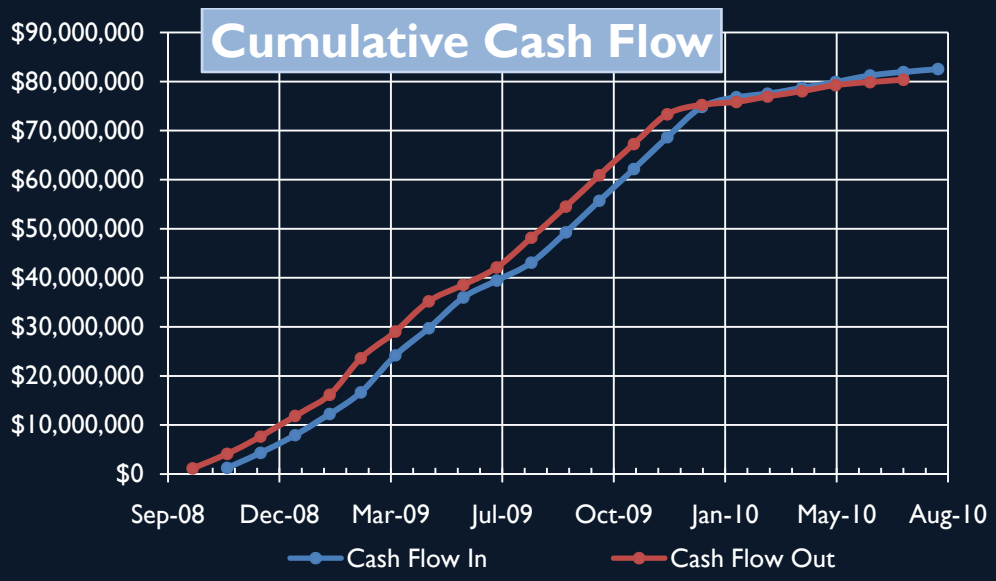




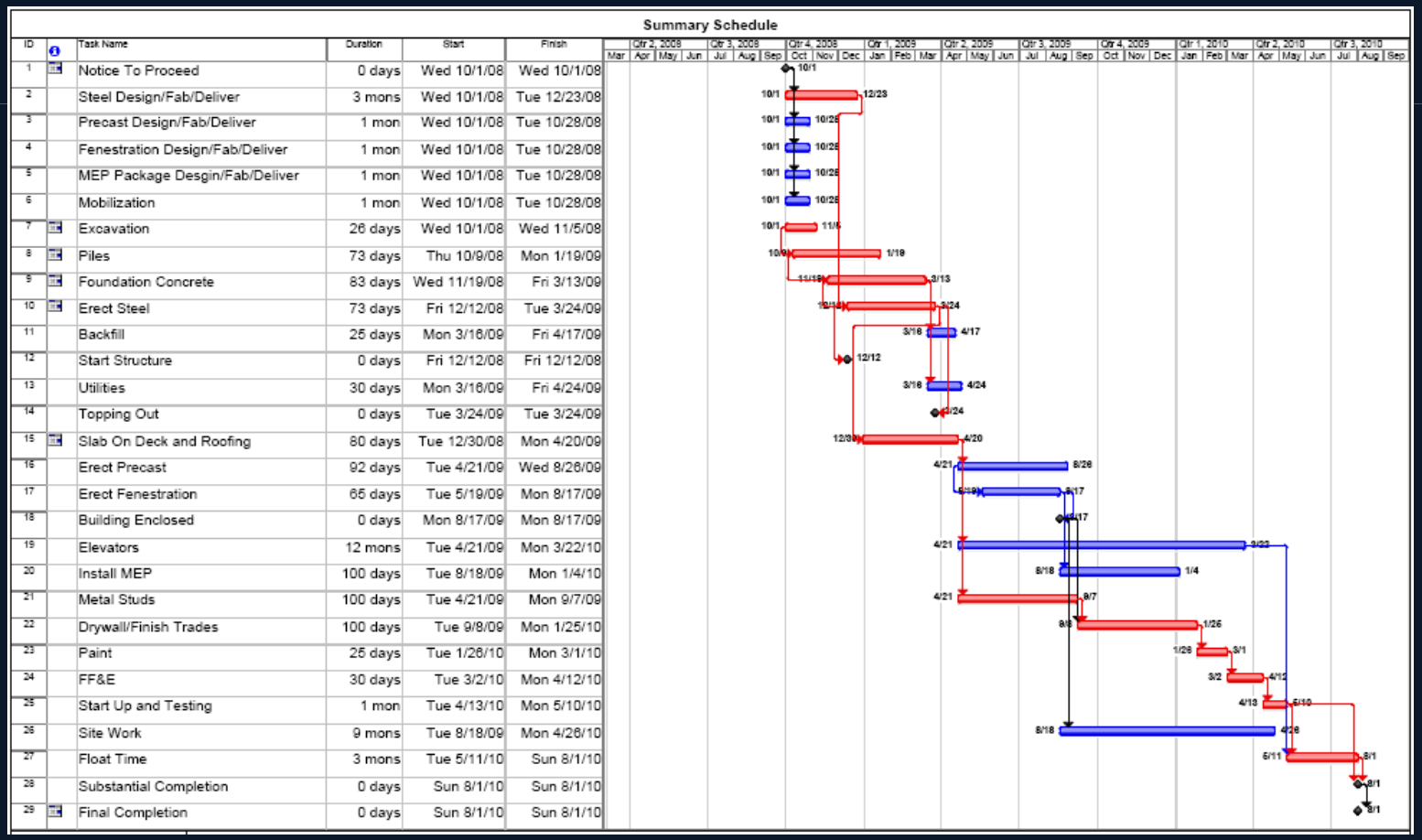




| Month | Paid Out | Cash Flow In |
|---|---|---|
| Mar-09 | | |
| | | |
| Backfill | -$659,735.80 | |
| Concrete | -$807,737.22 | |
| Steel | -$2,053,146.67 | |
| Electrical | -$3,932,259.38 | |
| Total | -$7,452,879.07 | |
| Owner | | $4,393,090.19 |
| | | |
| | Net Cash Flow | -$3,059,788.88 |
| | | |
| Apr-09 | | |
| | | |
| Backfill | -$659,735.80 | |
| Concrete | -$143,462.50 | |
| Electrical | -$3,495,341.67 | |
| Precast | -$590,911.89 | |
| Elevator | -$126,852.92 | |
| Drywall | -$412,519.69 | |
| Total | -$5,428,824.47 | |
| Owner | | $7,551,516.20 |
| | | |
| | Net Cash Flow | $2,122,691.73 |

# Summary Schedule

- 2 Cranes & Precast Panels => Shorter Schedule
- Shorter Schedule => Lower total cost, Greater contingency






| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | Notice To Proceed | 0 days | Wed 10/1/08 | Wed 10/1/08 |
| 2 | Steel Design/Fab/Deliver | 3 mons | Wed 10/1/08 | Tue 12/23/08 |
| 3 | Precast Design/Fab/Deliver | 1 mon | Wed 10/1/08 | Tue 10/28/08 |
| 4 | Fenestration Design/Fab/Deliver | 1 mon | Wed 10/1/08 | Tue 10/28/08 |
| 5 | MEP Package Desgin/Fab/Deliver | 1 mon | Wed 10/1/08 | Tue 10/28/08 |
| 6 | Mobilization | 1 mon | Wed 10/1/08 | Tue 10/28/08 |
| 7 | Excavation | 26 days | Wed 10/1/08 | Wed 11/5/08 |
| 8 | Piles | 73 days | Thu 10/9/08 | Mon 1/19/09 |
| 9 | Foundation Concrete | 83 days | Wed 11/19/08 | Fri 3/13/09 |
| 10 | Erect Steel | 73 days | Fri 12/12/08 | Tue 3/24/09 |
| 11 | Backfill | 25 days | Mon 3/16/09 | Fri 4/17/09 |
| 12 | Start Structure | 0 days | Fri 12/12/08 | Fri 12/12/08 |
| 13 | Utilities | 30 days | Mon 3/16/09 | Fri 4/24/09 |
| 14 | Topping Out | 0 days | Tue 3/24/09 | Tue 3/24/09 |
| 15 | Slab On Deck and Roofing | 80 days | Tue 12/30/08 | Mon 4/20/09 |
| 16 | Erect Precast | 92 days | Tue 4/21/09 | Wed 8/26/09 |
| 17 | Erect Fenestration | 65 days | Tue 5/19/09 | Mon 8/17/09 |
| 18 | Building Enclosed | 0 days | Mon 8/17/09 | Mon 8/17/09 |
| 19 | Elevators | 12 mons | Tue 4/21/09 | Mon 3/22/10 |
| 20 | Install MEP | 100 days | Tue 8/18/09 | Mon 1/4/10 |
| 21 | Metal Studs | 100 days | Tue 4/21/09 | Mon 9/7/09 |
| 22 | Drywall/Finish Trades | 100 days | Tue 9/8/09 | Mon 1/25/10 |
| 23 | Paint | 25 days | Tue 1/26/10 | Mon 3/1/10 |
| 24 | FF&E | 30 days | Tue 3/2/10 | Mon 4/12/10 |
| 25 | Start Up and Testing | 1 mon | Tue 4/13/10 | Mon 5/10/10 |
| 26 | Site Work | 9 mons | Tue 8/18/09 | Mon 4/26/10 |
| 27 | Float Time | 3 mons | Tue 5/11/10 | Sun 8/1/10 |
| 28 | Substantial Completion | 0 days | Sun 8/1/10 | Sun 8/1/10 |
| 29 | Final Completion | 0 days | Sun 8/1/10 | Sun 8/1/10 |

# Value Engineering Ideas



Garden Roof®

VS

Duro-Last® Membrane

By Public Law 104-106:

"Each executive agency shall establish and maintain cost-effective value engineering procedures and processes."

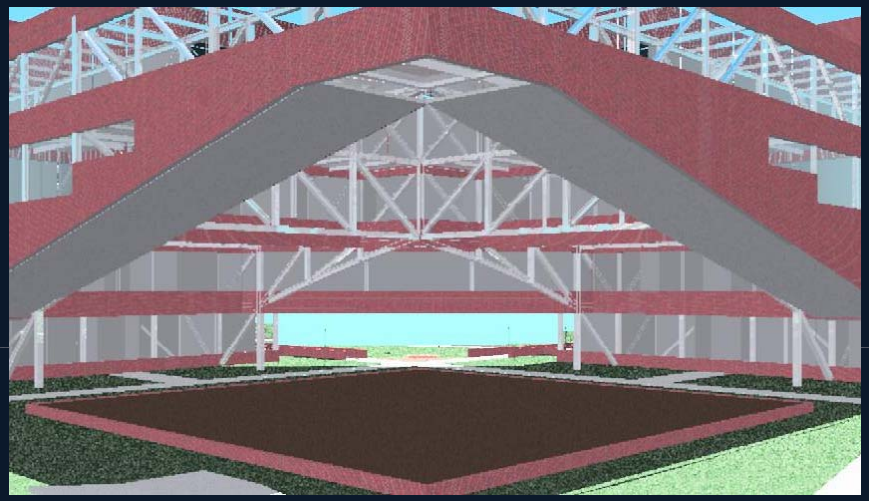
Brick Facade VS Precast panels

| Assembly Description | | Cost per SF |
|---|---|---|
| Precast conrete wall panels, avg. size 20'x10'x8", (no rigid insul.) | standard | $26.79 |
| | finished face | $36.76 |
| Unreinforced CMU wall, 12"x8"x16", 4500 psi strength, perlite core fill | hollow | $11.43 |
| | 75% solid | $12.76 |
| | solid | $12.17 |
| Reinforced CMU wall, 12"x8"x16", #5 vert. rein. at 16" OC, 4500 psi strength, | hollow | $13.38 |
| | 75% solid | $14.50 |
| | solid, double wythe, 6"x8"x16" | $19.20 |
| Brick wall, single wythe, 4" thick | common, running bond | $15.39 |
| | standard, running bond | $17.00 |
| Brick veneer, metal stud backup, running bond | standard, 20ga.x3-5/8", 16" OC | $21.00 |
| | standard, 16ga.x3-5/8", 16" OC | $21.85 |
| | glazed, 16ga.x3-5/8", 16" OC | $27.20 |

(note: some of the information in this section is from Nicholas Nigro Senior Thesis)

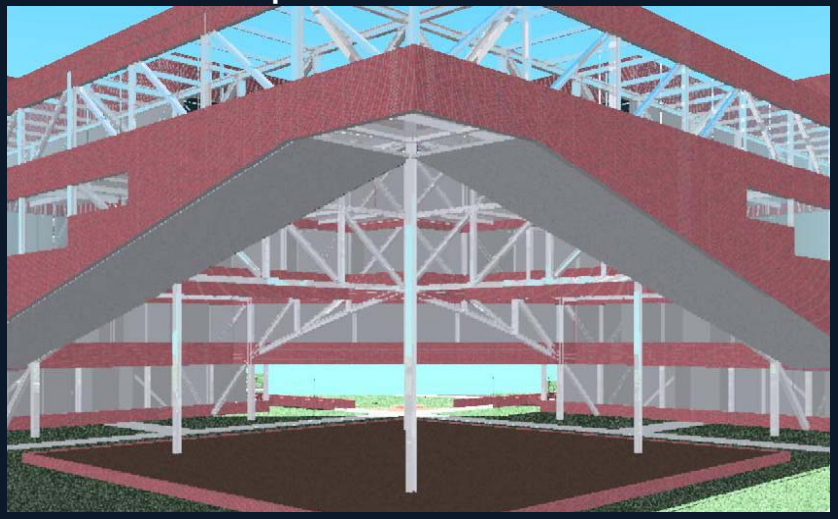
# Cost Saving Proposal





Current Structural

Proposed Structural



The move away from the cantilever design to the use of steel columns would significantly lower the cost of the structural system as the steel supports can be greatly downsized.

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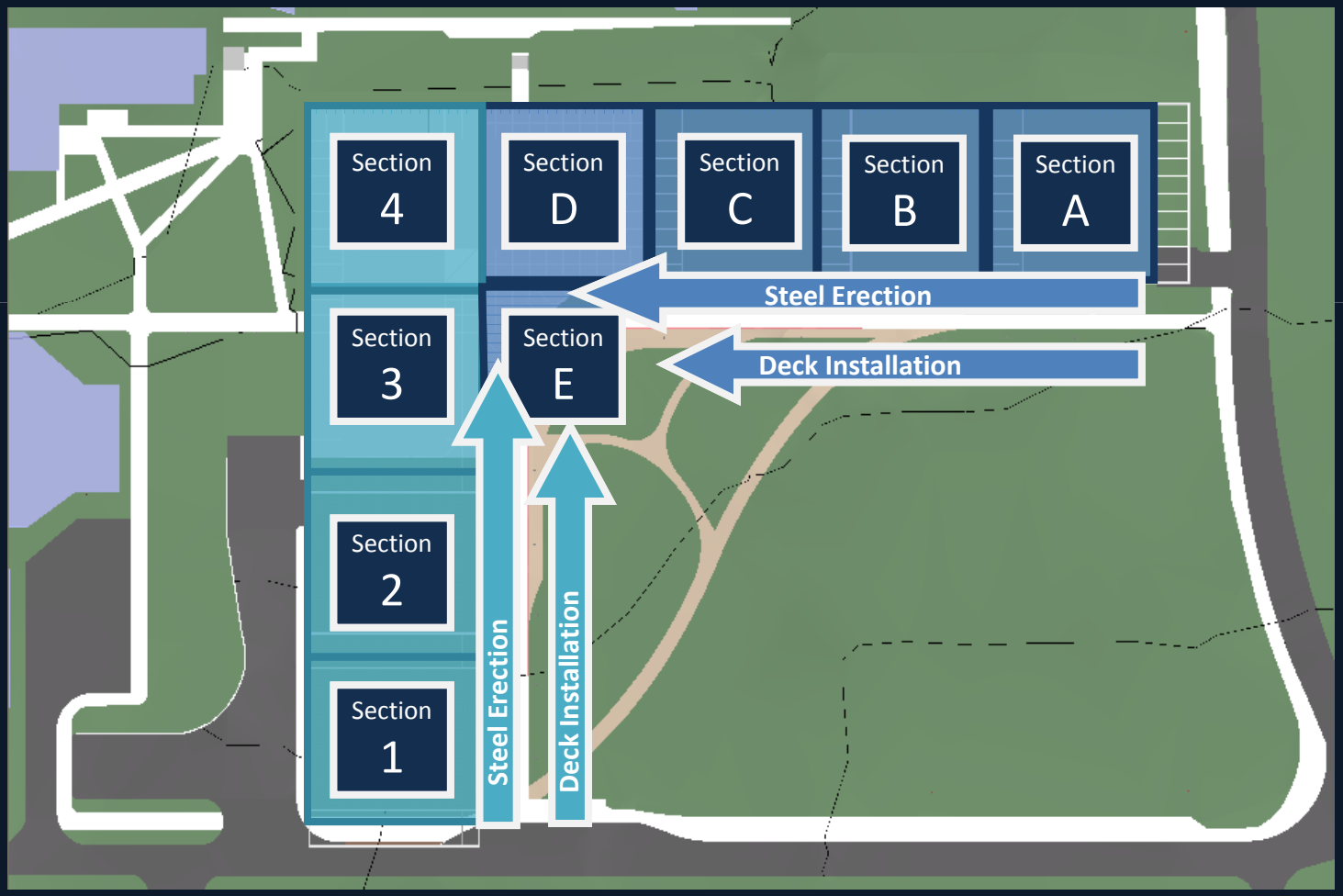
# Construction Phasing

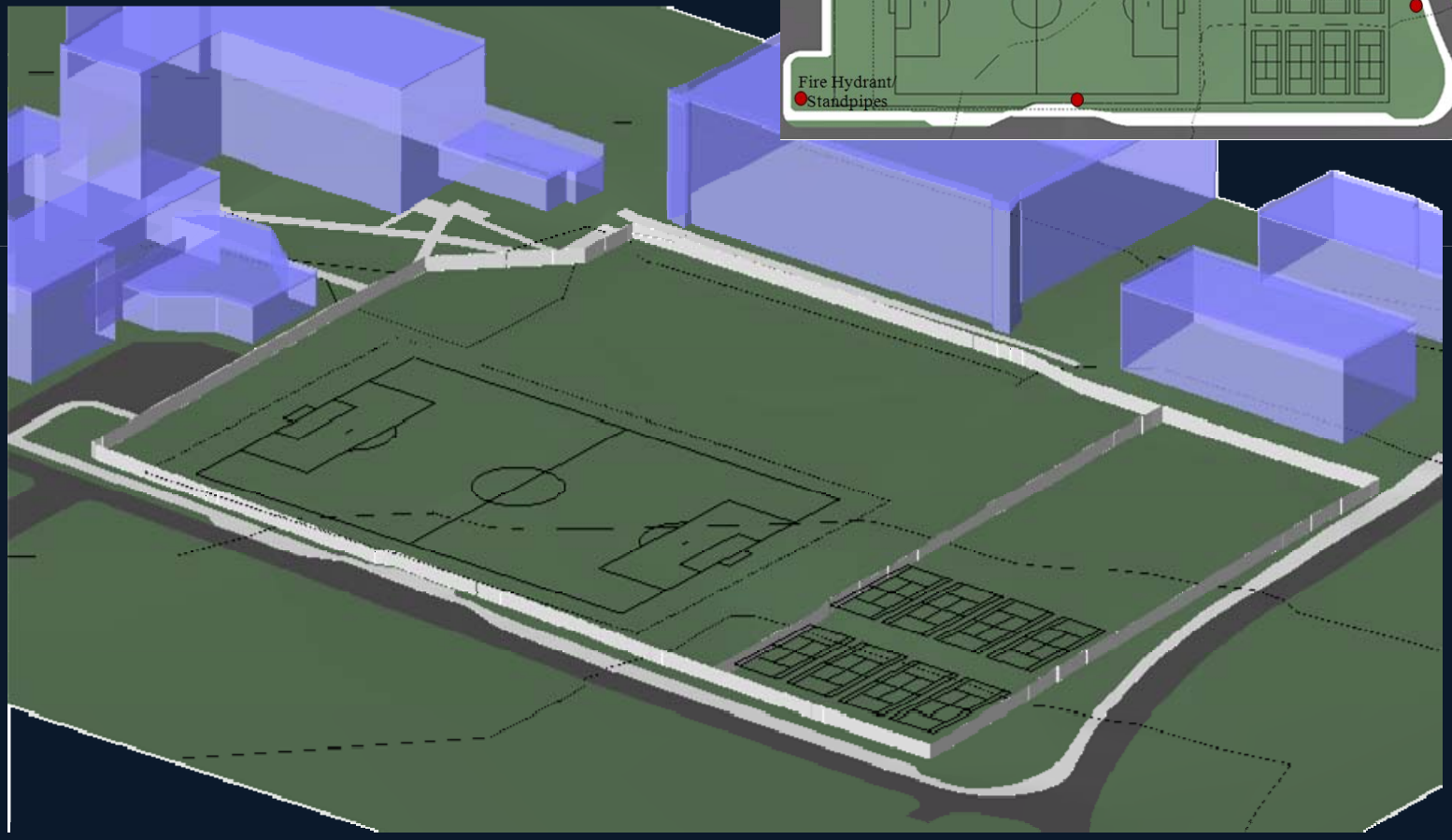





Each section is approximately 17,000 ft$^2$

MACH 5

# Existing Conditions

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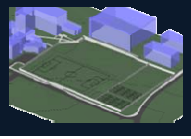
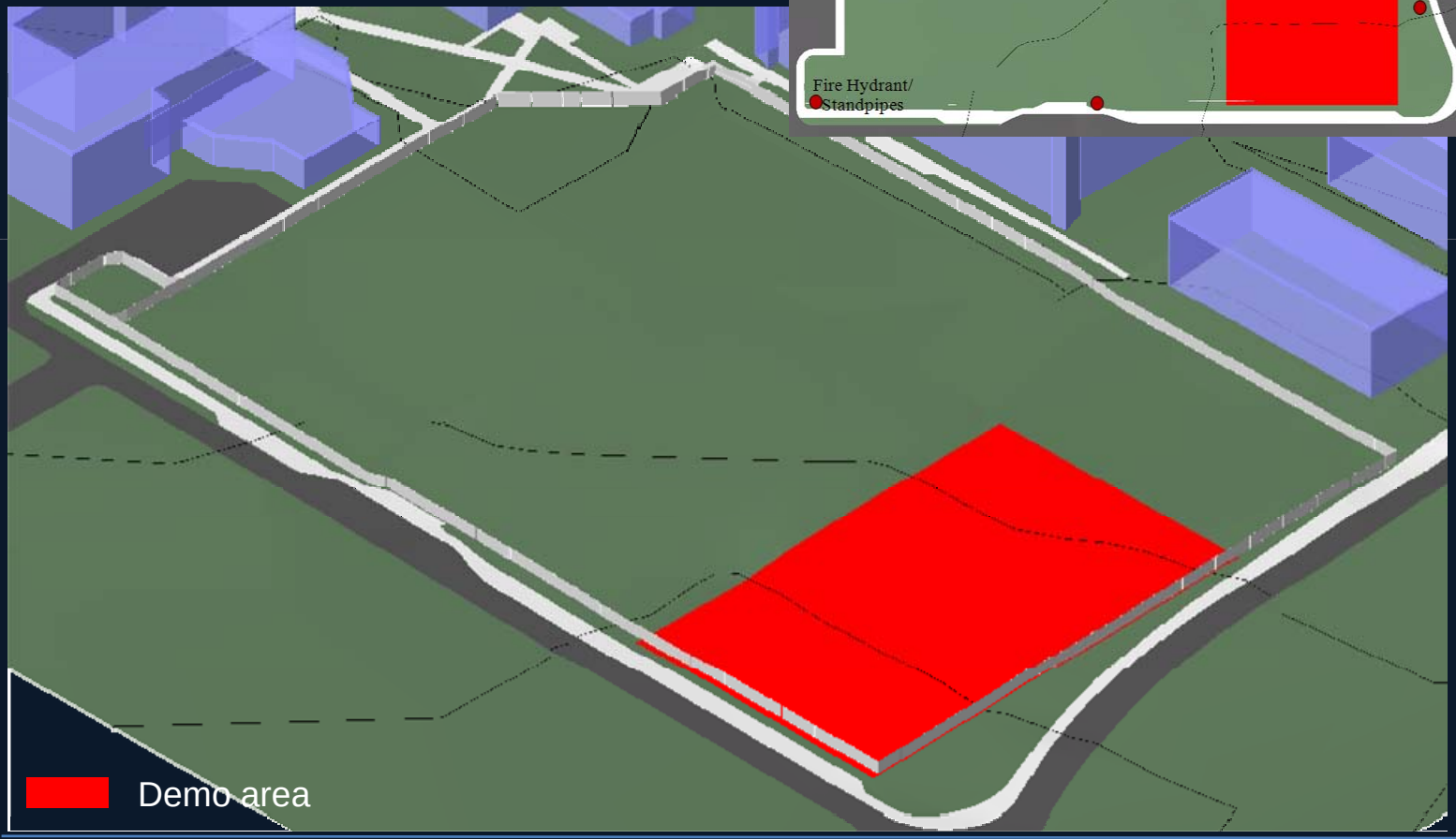
Existing | Demolition | Excavation | Substructure | Superstructure | Exterior | Interiors | Completion



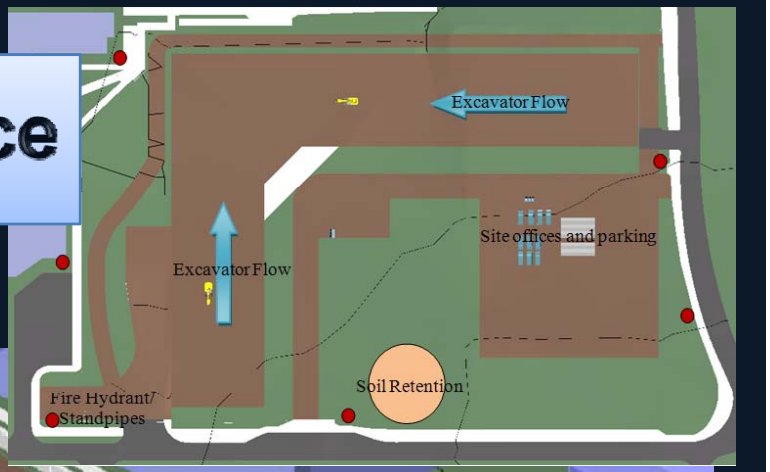
# Construction Sequence

## Demolition

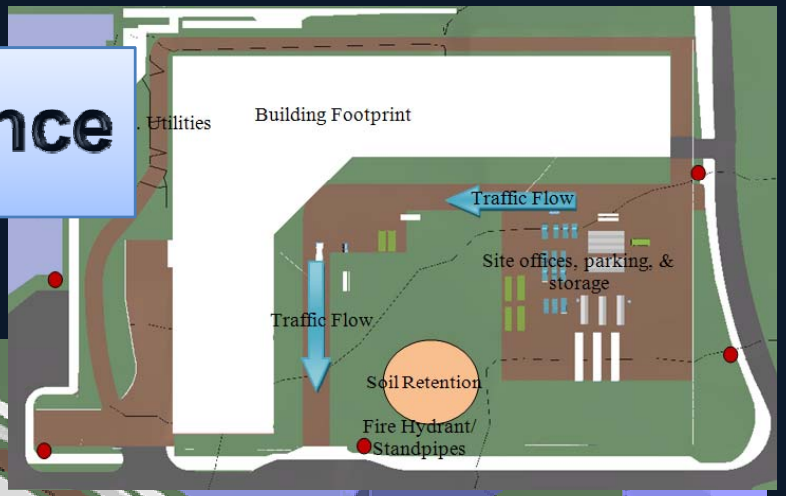
# Construction Sequence

## Excavation



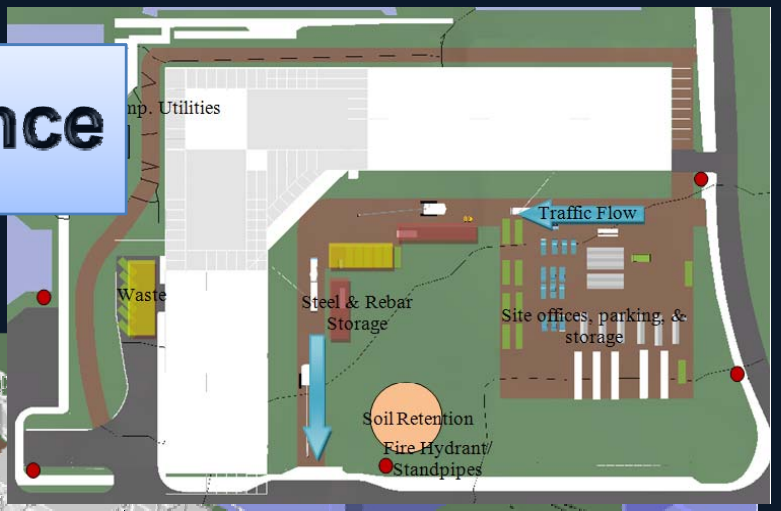

# Construction Sequence

## Substructure




# Construction Sequence

## Superstructure

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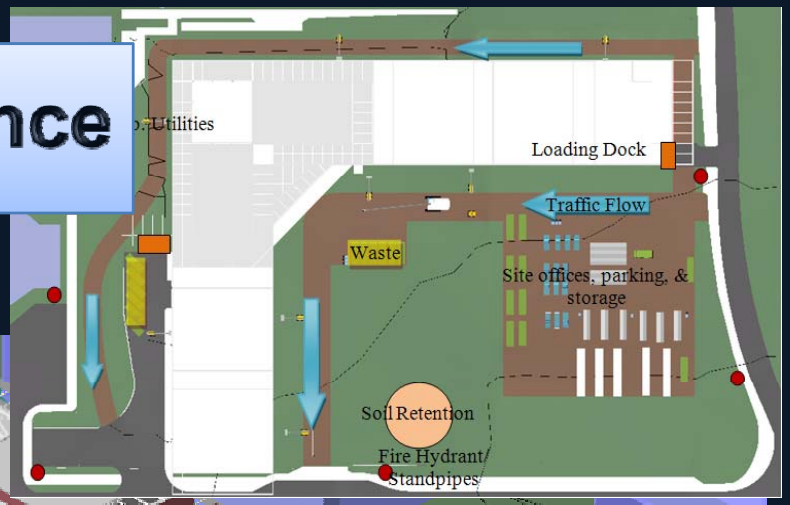
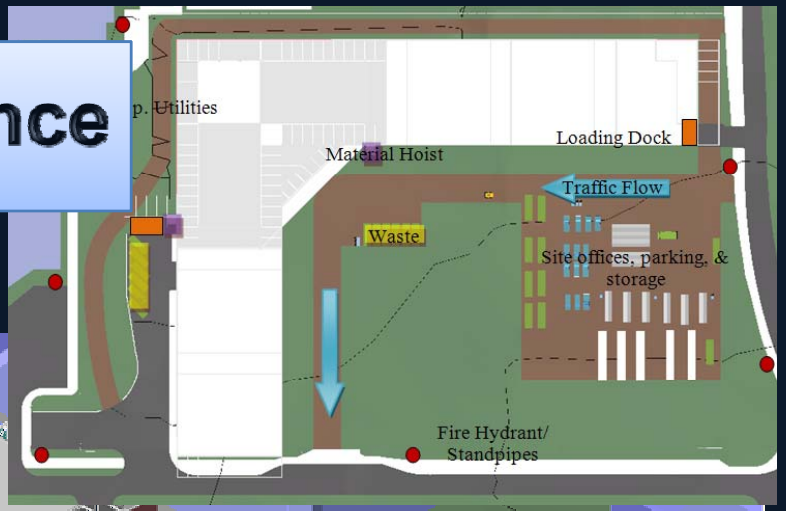
# Construction Sequence

## Exterior Enclosure




# Construction Sequence

## Interior Finishes

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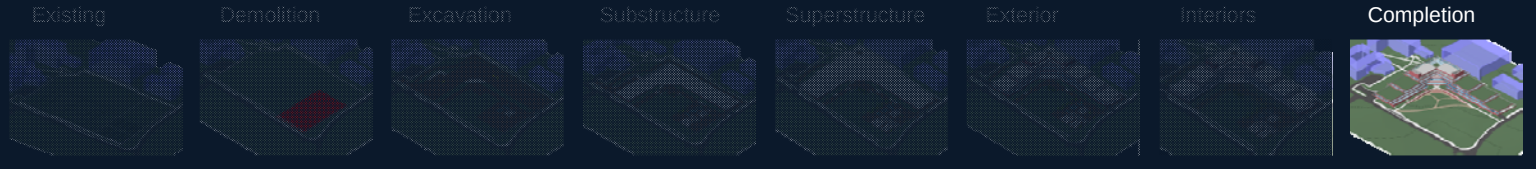
# Construction Sequence

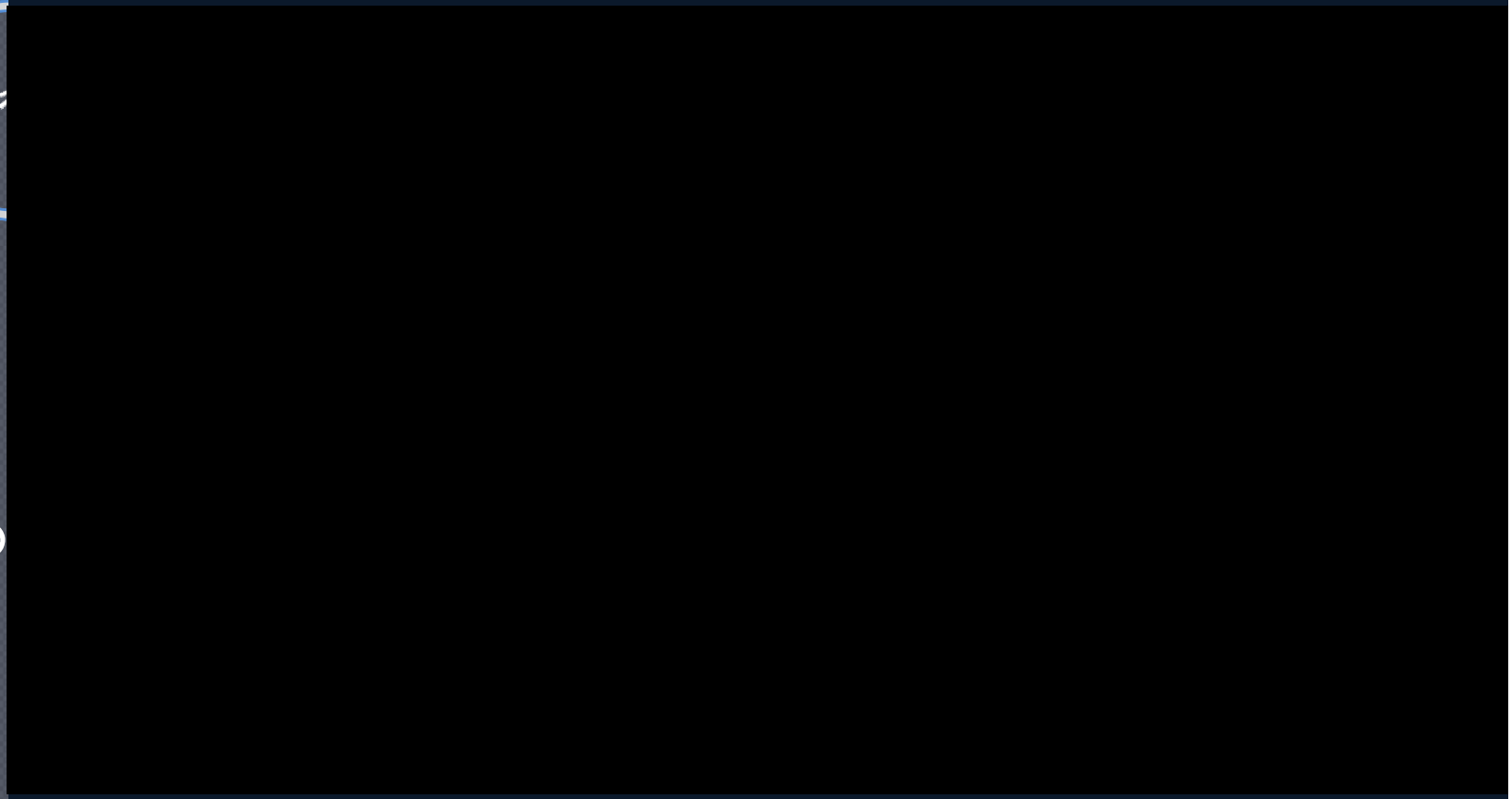
## Completion





MACH 5

# 4D Model



Who is MACH 5?

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# Completed Building

# Material Handling

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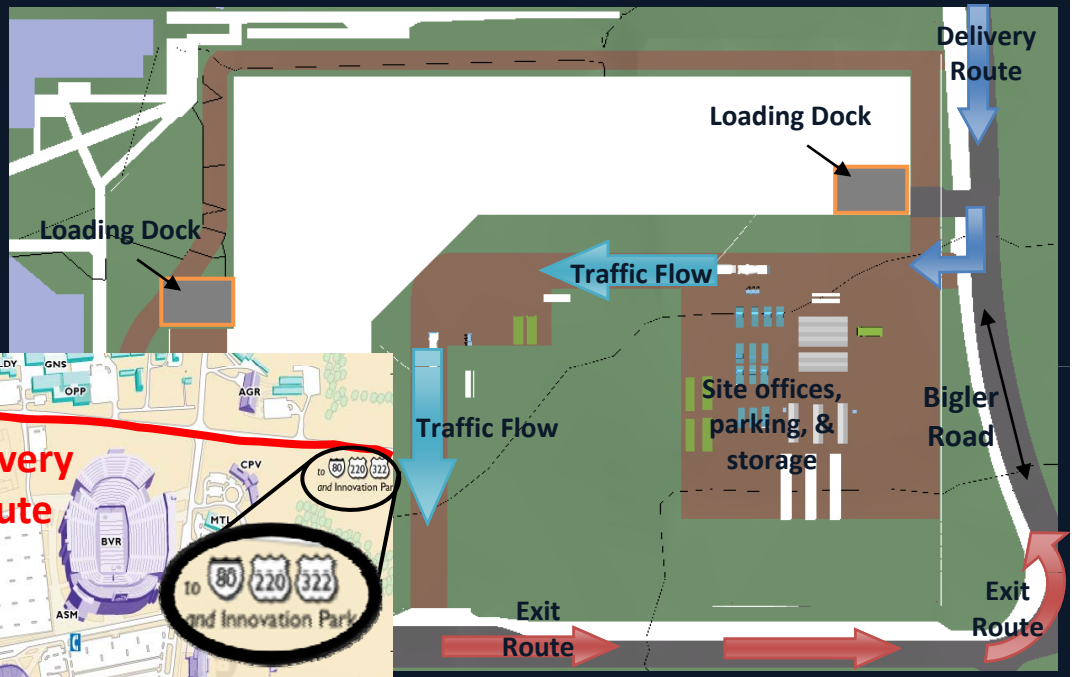
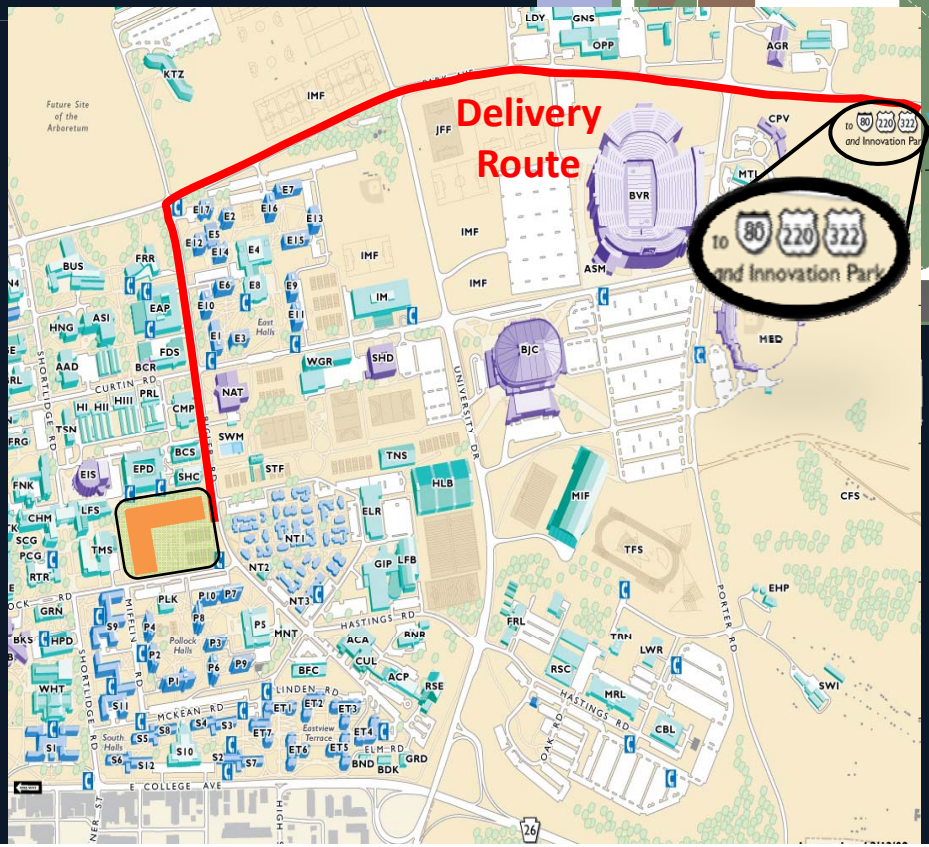


# LEED NC Analysis



- Sustainable Sites 8 points
- Water Efficiency 3 points
- Energy & Atmosphere 5 points
- Materials & Resources 5 points
- IEQ 12 points
- Innovation & Design 2 points

TOTAL 35 points

**"SILVER"**

CM @ Risk – Our Focus

- Proper Materials
- Monitor The Site
- Waste Handling

> Requires Open Feedback

> Consistent Development

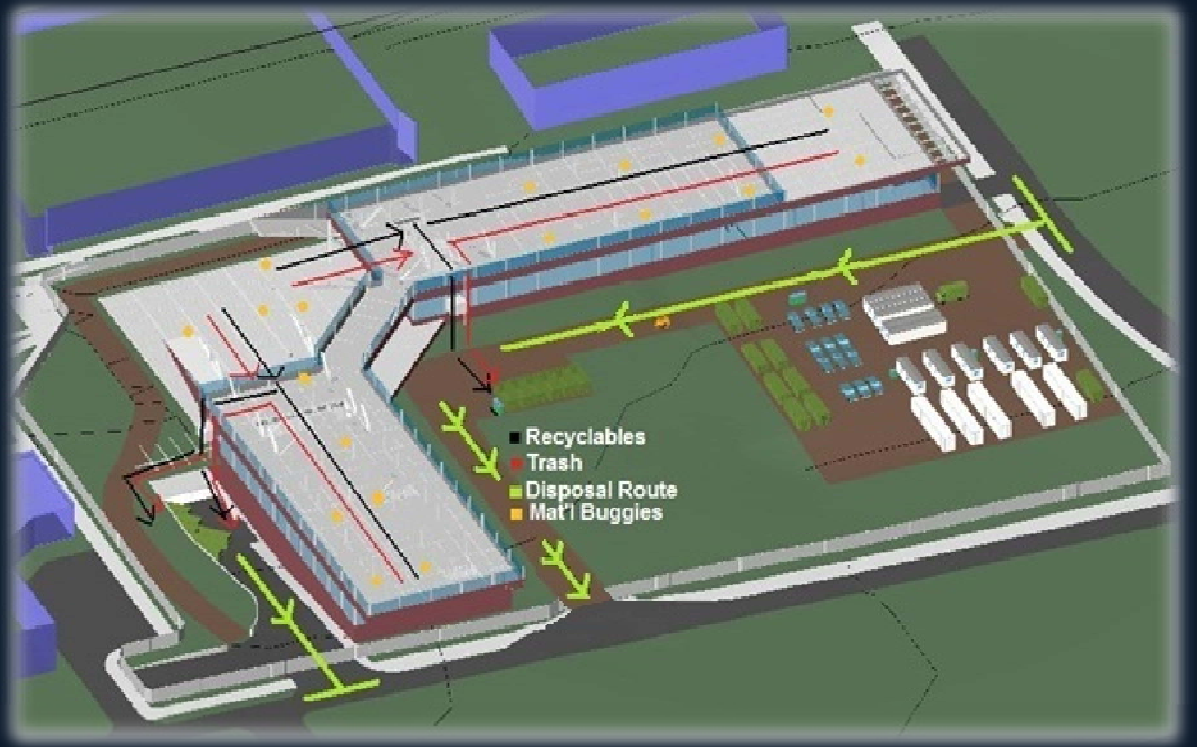
# Recycling and Waste Removal

- 5 Elements:  Metals – Lumber – Cardboard – Gypsum - Plastics
- Externally: Main dumpsters
- Internally: Buggy System
  - Pros - Streamline recycling, significant cost savings w/o sorting
  - Cons - Adverse effects, low production



Our 3 Pillars

- Education
- Accountability
- Communication



MACH 5

- Who is MACH 5?
- Project Background
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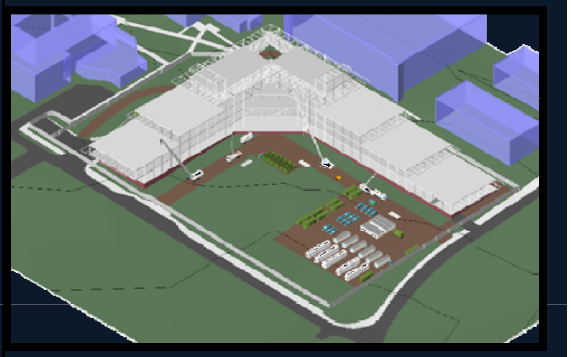
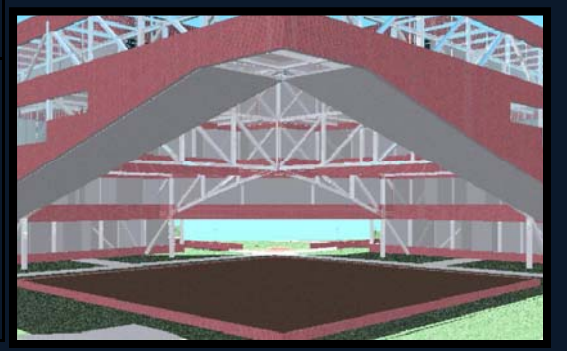
- Questions?

# Safety Plan

| Activity | Hazard | Safety Plan |
|---|---|---|
| Steel erection with two mobile cranes on site | Having two mobile cranes working onsite could result in collision which could cause bodily harm to anyone in the near vicinity and/or damage to the project. | Crane operators will be adequately trained prior to beginning erection. The sequence plan will be carefully followed to ensure minimal collision possibilities. Operator shifts will be kept as short as possible to ensure that both crane operators are alert while erecting. |
| Intoxicated students and/or visitors onsite | This could result in bodily harm, damage to the project, and/or missing or damaged equipment. | To minimize the risk of intruders, proper precautions will be taken to secure the site including an adequate fence around the site perimeter. Special care will be taken on holidays, football weekends, and during the Central Pennsylvania Festival of the Arts. |
| Cantilever construction | The complex design could result in complications during steel erection. If not carefully planned and executed, erection, especially of the cantilevers, could result in serious injuries. | The work flow has been adequately planned to minimize problems. All workers will complete safety training prior to erection. |



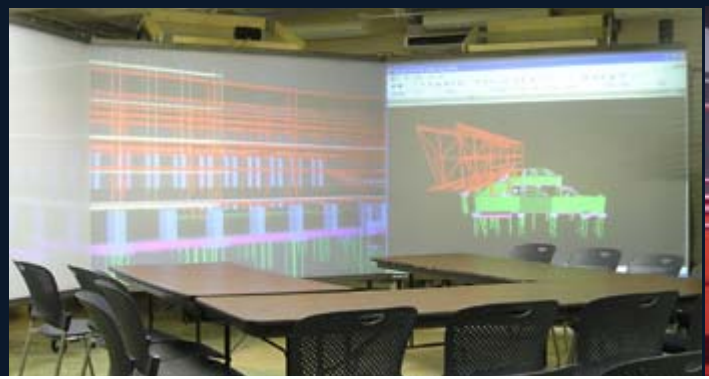
# Use of BIM

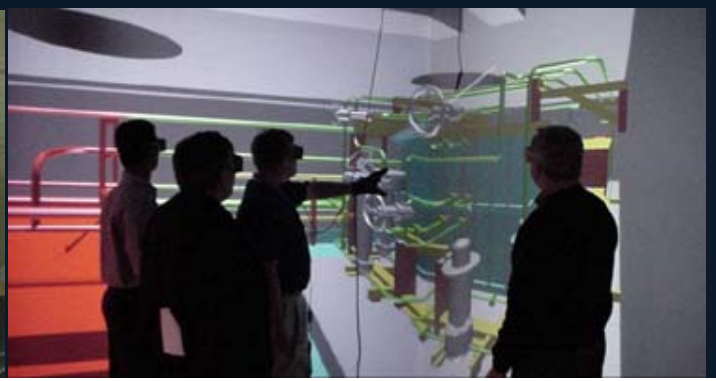
Building Information Modeling Capabilities

- Onsite Visualization Studio Trailer
- Use Autodesk Revit Software
  - Structural, mechanical and plumbing systems

Why we use a Building Information Model

- Accurate Takeoffs
- Collaborative Process
  - Design, construction and operational visualization
- Facility Lifecycle Management





# Clash Coordination

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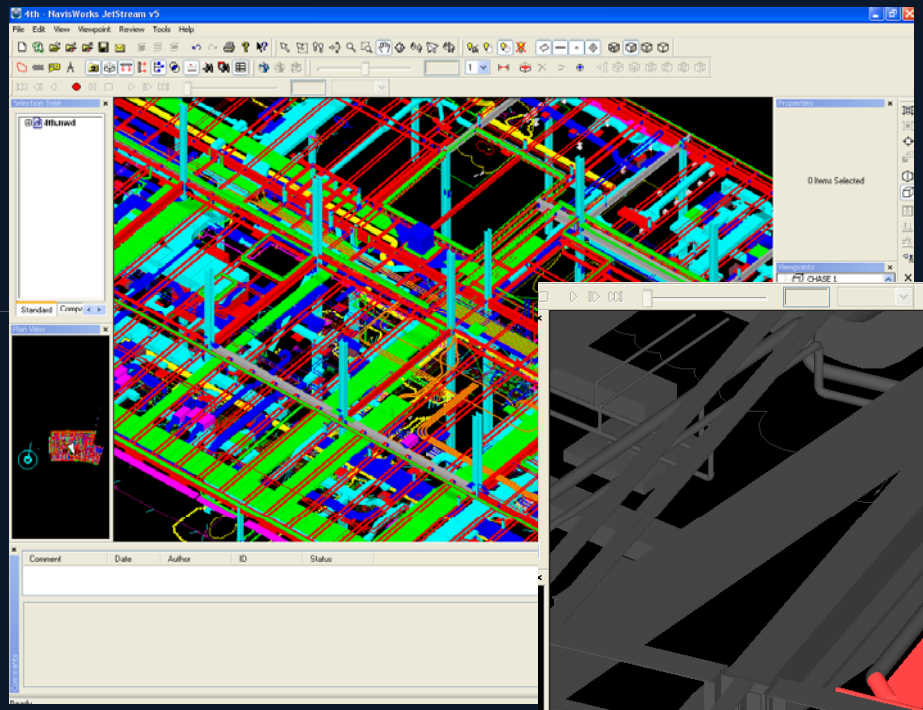
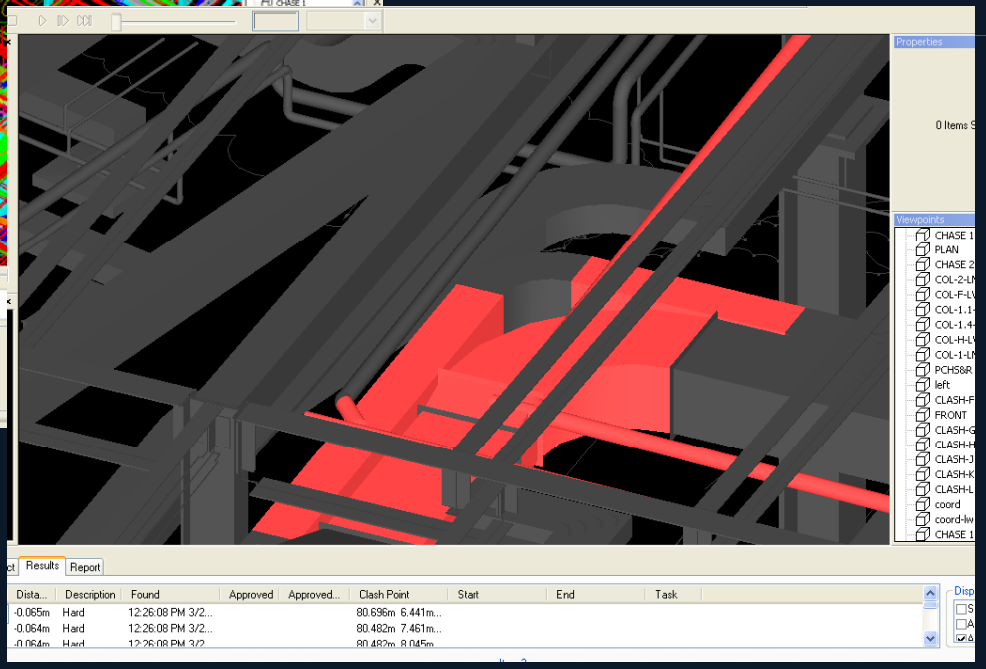


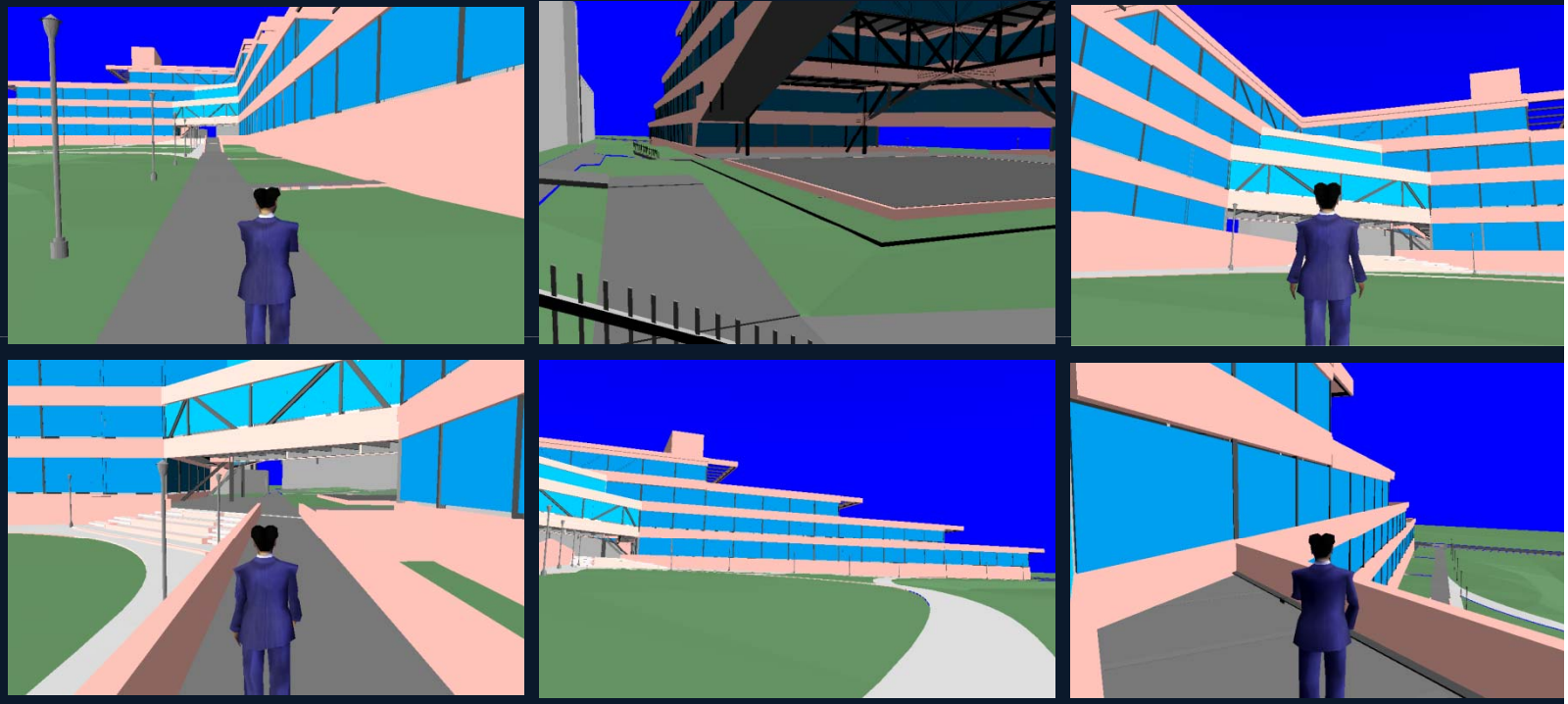
Manage BIM
- Subcontractor Systems
- Facilitate Subcontractors




Virtual Clash Detection
- Facilitate Coordination
- Avoid Field Clashes
- Monetary Savings

MACH 5

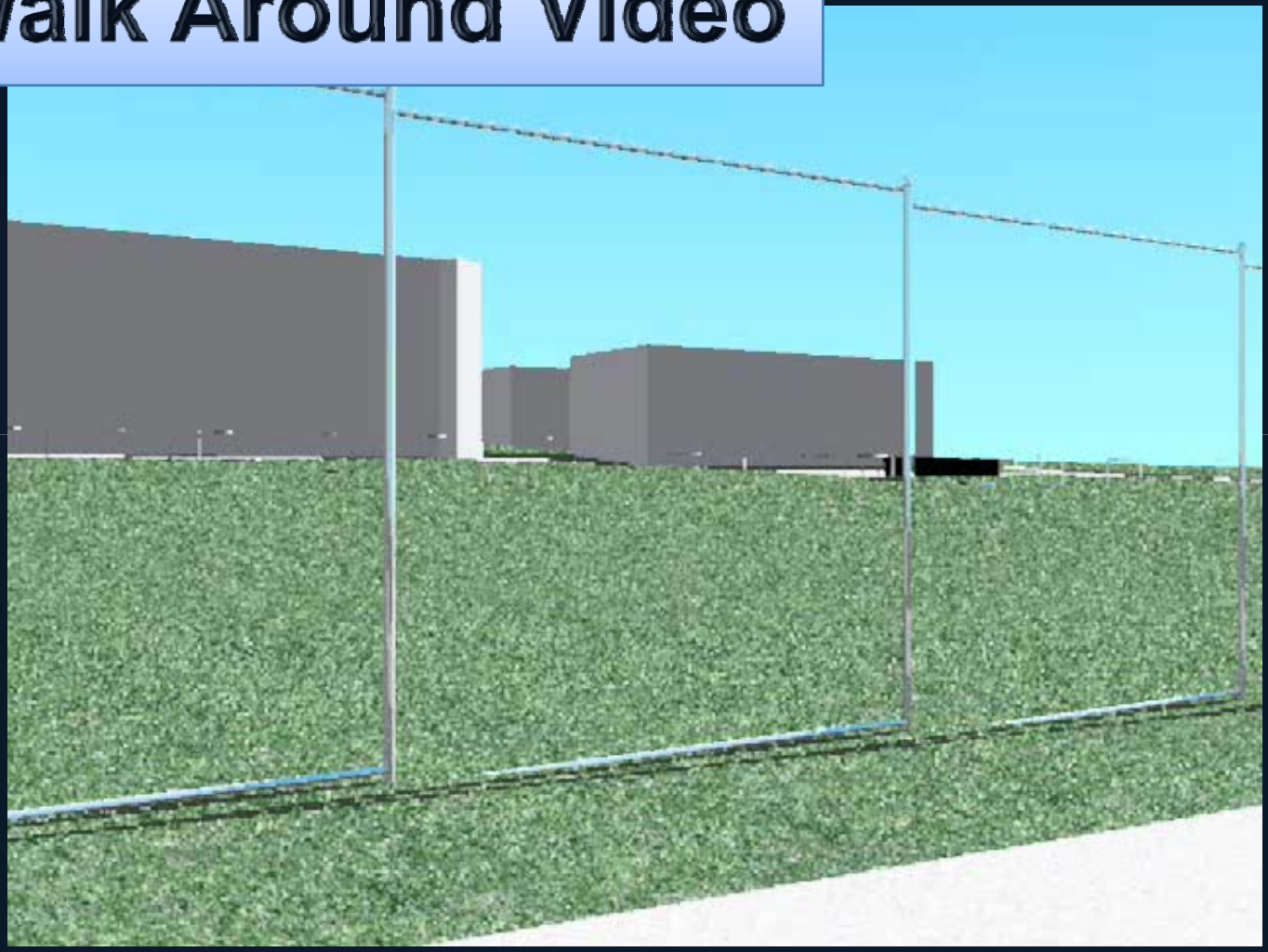
# Real Time Navigation



Promotional Building Website
- Owner visualization of product before built
- Facility Management
- Develop interest in Penn State and its programs
- Attract undergraduate and graduate students
- Student Interaction

MACH 5

# Walk Around Video



Visualization of site through the construction sequences.

- Promotional Website
- Interest students in Penn State
- Showcasing new buildings

# Closing

- Project cost: $95.7 million at 2.5% fee
- Construction through sequences and phases
- Committed to BIM
- Use of technology to gain owner feedback and market building
- Commitment to sustainability
- Team experience and cohesiveness

MACH 5

# Questions?

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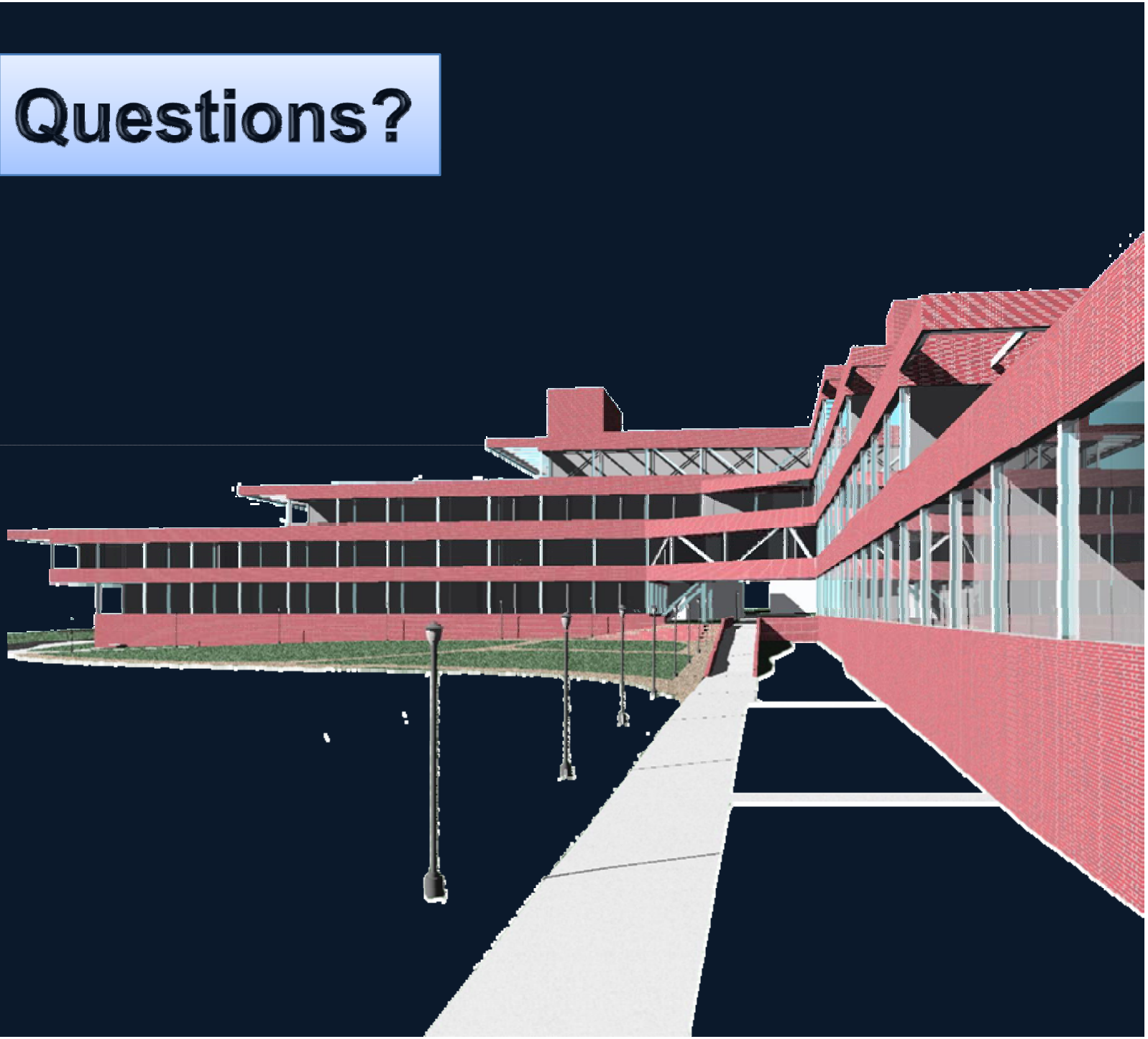

MACH 5

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# Site Investigation

- Who is MACH 5?
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# Detailed CPM schedule

- Who is MACH 5?
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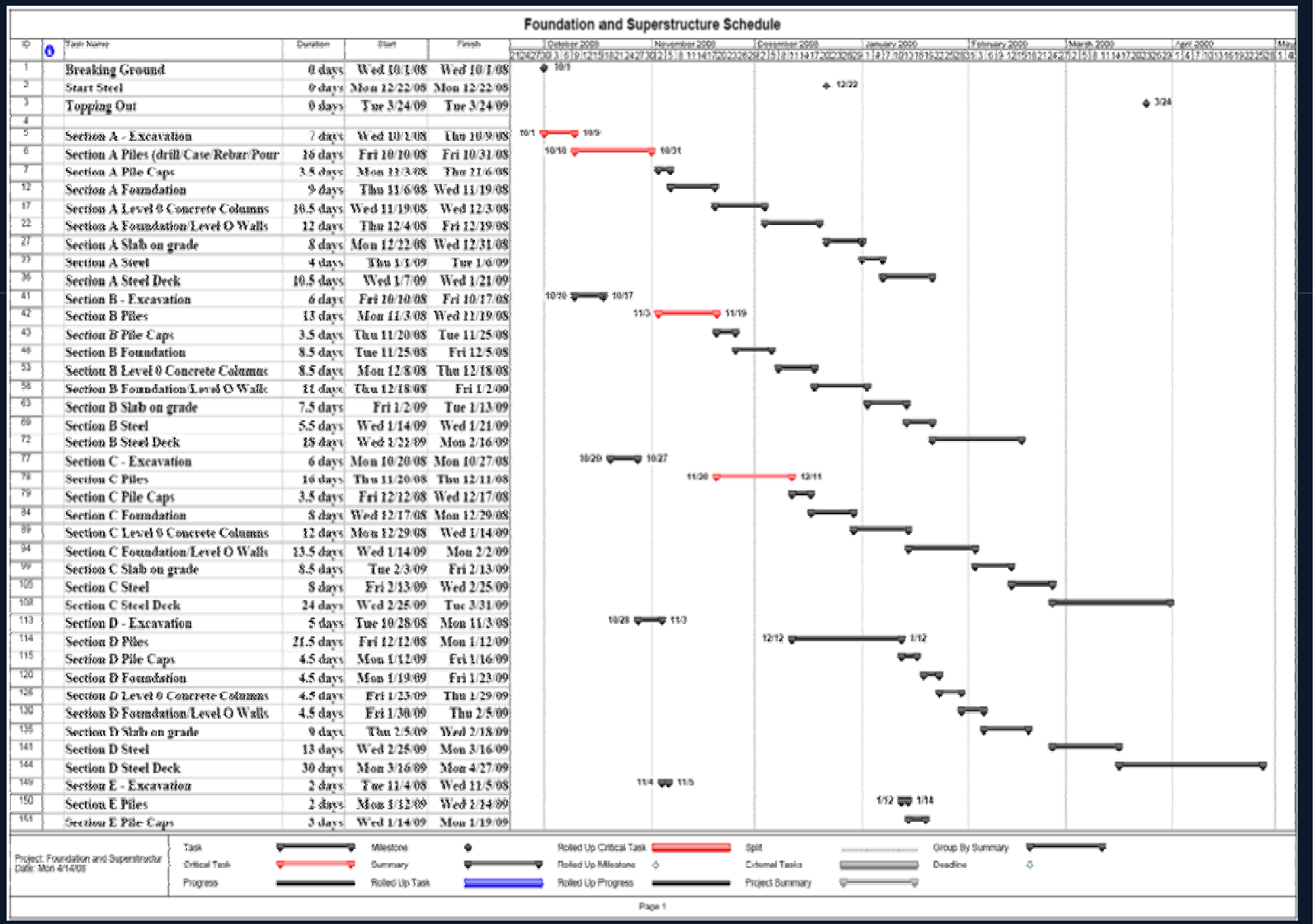


| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | Breaking Ground | 0 days | Wed 10/1/08 | Wed 10/1/08 |
| 2 | Start Steel | 0 days | Mon 12/22/08 | Mon 12/22/08 |
| 3 | Topping Out | 0 days | Tue 3/24/09 | Tue 3/24/09 |
| 4 | | | | |
| 5 | Section A - Excavation | 7 days | Wed 10/1/08 | Thu 10/9/08 |
| 6 | Section A Piles (drill/Case/Rebar/Pour | 16 days | Fri 10/10/08 | Fri 10/31/08 |
| 7 | Section A Pile Caps | 3.5 days | Mon 11/3/08 | Thu 11/6/08 |
| 12 | Section A Foundation | 9 days | Thu 11/6/08 | Wed 11/19/08 |
| 17 | Section A Level 0 Concrete Columns | 18.5 days | Wed 11/19/08 | Wed 12/3/08 |
| 22 | Section A Foundation/Level O Walls | 12 days | Thu 12/4/08 | Fri 12/19/08 |
| 27 | Section A Slab on grade | 8 days | Mon 12/22/08 | Wed 12/31/08 |
| 33 | Section A Steel | 4 days | Thu 1/1/09 | Tue 1/6/09 |
| 36 | Section A Steel Deck | 10.5 days | Wed 1/7/09 | Wed 1/21/09 |
| 41 | Section B - Excavation | 6 days | Fri 10/10/08 | Fri 10/17/08 |
| 42 | Section B Piles | 13 days | Mon 11/3/08 | Wed 11/19/08 |
| 43 | Section B Pile Caps | 3.5 days | Thu 11/20/08 | Tue 11/25/08 |
| 48 | Section B Foundation | 8.5 days | Tue 11/25/08 | Fri 12/5/08 |
| 53 | Section B Level 0 Concrete Columns | 8.5 days | Mon 12/8/08 | Thu 12/18/08 |
| 58 | Section B Foundation/Level O Walls | 11 days | Thu 12/18/08 | Fri 1/2/09 |
| 63 | Section B Slab on grade | 7.5 days | Fri 1/2/09 | Tue 1/13/09 |
| 69 | Section B Steel | 5.5 days | Wed 1/14/09 | Wed 1/21/09 |
| 72 | Section B Steel Deck | 18 days | Wed 1/21/09 | Mon 2/16/09 |
| 77 | Section C - Excavation | 6 days | Mon 10/20/08 | Mon 10/27/08 |
| 78 | Section C Piles | 16 days | Thu 11/20/08 | Thu 12/11/08 |
| 79 | Section C Pile Caps | 3.5 days | Fri 12/12/08 | Wed 12/17/08 |
| 84 | Section C Foundation | 8 days | Wed 12/17/08 | Mon 12/29/08 |
| 89 | Section C Level 0 Concrete Columns | 12 days | Mon 12/29/08 | Wed 1/14/09 |
| 94 | Section C Foundation/Level O Walls | 13.5 days | Wed 1/14/09 | Mon 2/2/09 |
| 99 | Section C Slab on grade | 8.5 days | Tue 2/3/09 | Fri 2/13/09 |
| 103 | Section C Steel | 8 days | Fri 2/13/09 | Wed 2/25/09 |
| 108 | Section C Steel Deck | 24 days | Wed 2/25/09 | Tue 3/31/09 |
| 113 | Section D - Excavation | 5 days | Tue 10/28/08 | Mon 11/3/08 |
| 114 | Section D Piles | 21.5 days | Fri 12/12/08 | Mon 1/12/09 |
| 115 | Section D Pile Caps | 4.5 days | Mon 1/12/09 | Fri 1/16/09 |
| 120 | Section D Foundation | 4.5 days | Mon 1/19/09 | Fri 1/23/09 |
| 126 | Section D Level 0 Concrete Columns | 4.5 days | Fri 1/23/09 | Thu 1/29/09 |
| 130 | Section D Foundation/Level O Walls | 4.5 days | Fri 1/30/09 | Thu 2/5/09 |
| 135 | Section D Slab on grade | 9 days | Thu 2/5/09 | Wed 2/18/09 |
| 141 | Section D Steel | 13 days | Wed 2/25/09 | Mon 3/16/09 |
| 144 | Section D Steel Deck | 30 days | Mon 3/16/09 | Mon 4/27/09 |
| 149 | Section E - Excavation | 2 days | Tue 11/4/08 | Wed 11/5/08 |
| 150 | Section E Piles | 2 days | Mon 1/12/09 | Wed 1/14/09 |
| 151 | Section E Pile Caps | 3 days | Wed 1/14/09 | Mon 1/19/09 |

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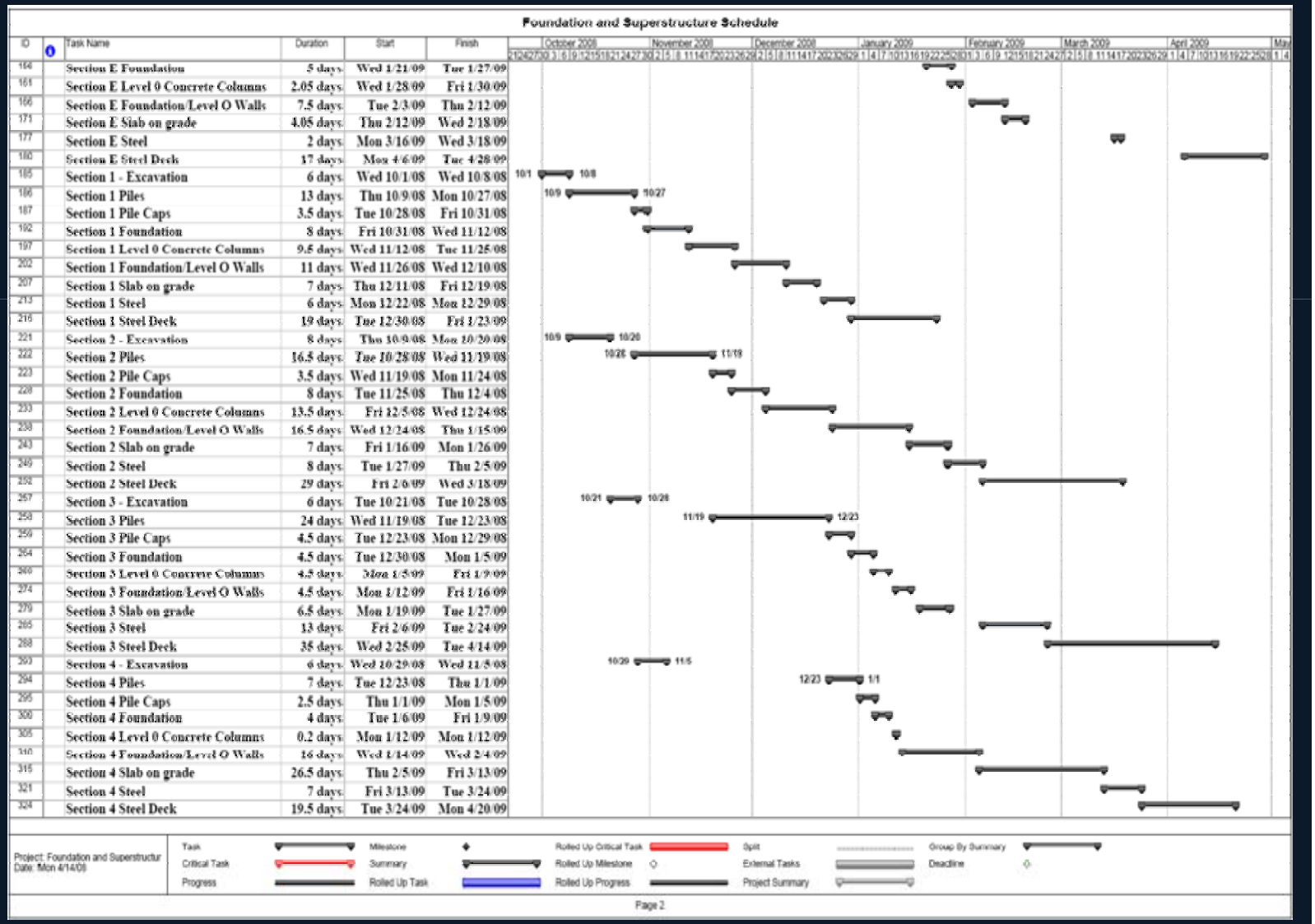


| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 164 | Section E Foundation | 5 days | Wed 1/21/09 | Tue 1/27/09 |
| 165 | Section E Level 0 Concrete Columns | 2.05 days | Wed 1/28/09 | Fri 1/30/09 |
| 166 | Section E Foundation/Level O Walls | 7.5 days | Tue 2/3/09 | Thu 2/12/09 |
| 171 | Section E Slab on grade | 4.05 days | Thu 2/12/09 | Wed 2/18/09 |
| 177 | Section E Steel | 2 days | Mon 3/16/09 | Wed 3/18/09 |
| 180 | Section E Steel Deck | 17 days | Mon 4/6/09 | Tue 4/28/09 |
| 185 | Section 1 - Excavation | 6 days | Wed 10/1/08 | Wed 10/8/08 |
| 186 | Section 1 Piles | 13 days | Thu 10/9/08 | Mon 10/27/08 |
| 187 | Section 1 Pile Caps | 3.5 days | Tue 10/28/08 | Fri 10/31/08 |
| 192 | Section 1 Foundation | 8 days | Fri 10/31/08 | Wed 11/12/08 |
| 197 | Section 1 Level 0 Concrete Columns | 9.5 days | Wed 11/12/08 | Tue 11/25/08 |
| 202 | Section 1 Foundation/Level O Walls | 11 days | Wed 11/26/08 | Wed 12/10/08 |
| 207 | Section 1 Slab on grade | 7 days | Thu 12/11/08 | Fri 12/19/08 |
| 213 | Section 1 Steel | 6 days | Mon 12/22/08 | Mon 12/29/08 |
| 216 | Section 1 Steel Deck | 19 days | Tue 12/30/08 | Fri 1/23/09 |
| 221 | Section 2 - Excavation | 8 days | Thu 10/9/08 | Mon 10/20/08 |
| 222 | Section 2 Piles | 16.5 days | Tue 10/28/08 | Wed 11/19/08 |
| 223 | Section 2 Pile Caps | 3.5 days | Wed 11/19/08 | Mon 11/24/08 |
| 228 | Section 2 Foundation | 8 days | Tue 11/25/08 | Thu 12/4/08 |
| 233 | Section 2 Level 0 Concrete Columns | 13.5 days | Fri 12/5/08 | Wed 12/24/08 |
| 238 | Section 2 Foundation/Level O Walls | 16.5 days | Wed 12/24/08 | Thu 1/15/09 |
| 243 | Section 2 Slab on grade | 7 days | Fri 1/16/09 | Mon 1/26/09 |
| 249 | Section 2 Steel | 8 days | Tue 1/27/09 | Thu 2/5/09 |
| 252 | Section 2 Steel Deck | 29 days | Fri 2/6/09 | Wed 3/18/09 |
| 257 | Section 3 - Excavation | 6 days | Tue 10/21/08 | Tue 10/28/08 |
| 258 | Section 3 Piles | 24 days | Wed 11/19/08 | Tue 12/23/08 |
| 259 | Section 3 Pile Caps | 4.5 days | Tue 12/23/08 | Mon 12/29/08 |
| 264 | Section 3 Foundation | 4.5 days | Tue 12/30/08 | Mon 1/5/09 |
| 269 | Section 3 Level 0 Concrete Columns | 4.5 days | Mon 1/5/09 | Fri 1/9/09 |
| 274 | Section 3 Foundation/Level O Walls | 4.5 days | Mon 1/12/09 | Fri 1/16/09 |
| 279 | Section 3 Slab on grade | 6.5 days | Mon 1/19/09 | Tue 1/27/09 |
| 285 | Section 3 Steel | 13 days | Fri 2/6/09 | Tue 2/24/09 |
| 288 | Section 3 Steel Deck | 35 days | Wed 2/25/09 | Tue 4/14/09 |
| 293 | Section 4 - Excavation | 6 days | Wed 10/29/08 | Wed 11/5/08 |
| 294 | Section 4 Piles | 7 days | Tue 12/23/08 | Thu 1/1/09 |
| 295 | Section 4 Pile Caps | 2.5 days | Thu 1/1/09 | Mon 1/5/09 |
| 300 | Section 4 Foundation | 4 days | Tue 1/6/09 | Fri 1/9/09 |
| 305 | Section 4 Level 0 Concrete Columns | 0.2 days | Mon 1/12/09 | Mon 1/12/09 |
| 310 | Section 4 Foundation/Level O Walls | 16 days | Wed 1/14/09 | Wed 2/4/09 |
| 315 | Section 4 Slab on grade | 26.5 days | Thu 2/5/09 | Fri 3/13/09 |
| 321 | Section 4 Steel | 7 days | Fri 3/13/09 | Tue 3/24/09 |
| 324 | Section 4 Steel Deck | 19.5 days | Tue 3/24/09 | Mon 4/20/09 |

# Estimate Summary



| Project Staff | % on Precon | % on Construction | Total % on Job | Resulting Weeks |
|---|---|---|---|---|
| Project Manager | 100 | 50 | 60 | 57.6 |
| Assistant Project Manager | 100 | 50 | 60 | 57.6 |
| Superintendent | 25 | 100 | 85 | 81.6 |
| Assistant Superintendent | 25 | 100 | 85 | 81.6 |
| Assistant Superintendent | 25 | 100 | 85 | 81.6 |
| Field Survey/Engineer | 25 | 100 | 85 | 81.6 |
| Project Engineer | 75 | 50 | 55 | 52.8 |
| Office Engineer | 75 | 50 | 55 | 52.8 |

| | | | | | |
|---|---|---|---|---|---|
| 01 | **General Requirements** | | 4.33% | $14.53 | $3,759,541.00 |
| | Administrative Expenses | $1,422,365.00 | | | |
| | Temporary Construction | $519,662.00 | | | |
| | General Operations | $1,817,514.00 | | | |

GENERAL CONDITIONS

PROJECT: Material & Life Sciences II

OWNER: Chris Magent

| | | | | Labor | | | Material | | |
|---|---|---|---|---|---|---|---|---|---|
| Code | Description | Qty | Unit | Unit Price | Burden | Cost | Unit Price | Cost | Total Cost |
| **Administrative Expense** | | | | | | | | | |
| | MANAGEMENT & SUPERVISION | | | | | | | | |
| 1001 | Project Manager | 57.6 | wks | $2,100 | | $120,960 | | | $ 120,960 |
| 1002 | Assistant Project Manager | 57.6 | wks | $1,600 | | $92,160 | | | $ 92,160 |
| 1003 | Project Superintendent | 81.6 | wks | $1,950 | | $159,120 | | | $ 159,120 |
| 1004 | Assistant Superintendent | 81.6 | wks | $1,550 | | $126,480 | | | $ 126,480 |
| 1005 | Assistant Superintendent | 81.6 | wks | $1,550 | | $126,480 | | | $ 126,480 |
| 1006 | Field Survey/Engineer | 81.6 | wks | $1,125 | | $91,800 | | | $ 91,800 |
| | ENGINEERING & SAFETY | | | | | | | | |
| 1101 | Project Engineer | 52.8 | wks | $1,750 | | $92,400 | | | $ 92,400 |
| 1102 | Office Engineer | 52.8 | wks | $1,300 | | $68,640 | | | $ 68,640 |
| 1103 | Field Engineer | 43.2 | wks | $1,125 | | $48,600 | | | $ 48,600 |